

# CASE STUDY



## MACHINING AND GRINDING FLUID MANAGEMENT PROGRAM

### CHALLENGES

A leader in the design, manufacture and service of aircraft engines was using a competitive product for their machining and grinding coolant. The coolant volume for the facility was approximately 55,000 diluted gallons, with 2.4 million pounds of coolant waste being generated annually. The manufacturer was looking to cut total waste by 90% over the course of ten years.

To help improve their operations, Quaker recommended:

- » Manufacturer upgrade to QUAKERCOOL® 7205 for all non-aluminum machining and grinding
- » Implement a coolant management program and additional data-driven coolant changes

Quaker wanted to show that with the coolant upgrade and program implementation:

- » Significant annual savings could be achieved in labor, fluid treatment, and coolant spend
- » Operator exposure levels and dermatitis could be reduced

### THE SOLUTION

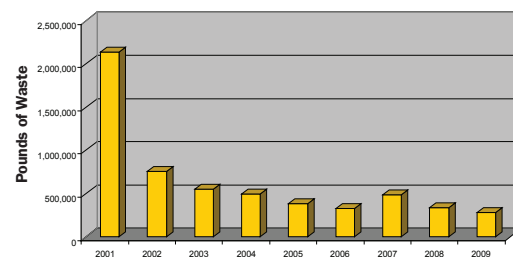
In 2001 the non-aluminum systems were converted to Quaker's QUAKERCOOL® 7205, and a coolant management program was implemented. These immediate changes resulted in the following annual cost savings and reductions in waste:

AREA OF SAVINGS	ANNUAL COST SAVINGS
Treatment	\$219,920
Labor	\$163,820
Coolant	\$78,678
<b>Total</b>	<b>\$462,418</b>

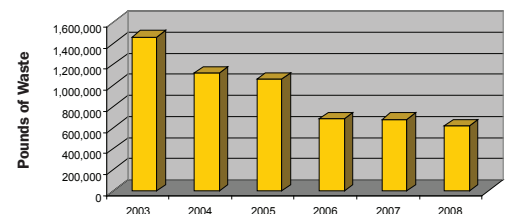
diversified its services, resulting in reductions in labor costs, coolant spend and treatment costs totaling over \$3 million, but has also become a true partner who adds value. The following are the additional product changes and program implementations which resulted in additional savings over a period of eight years.

In 2004, Quaker's services were expanded to include a parts washer program, resulting in a 2/3 reduction in washer waste, along with the following annual cost savings:

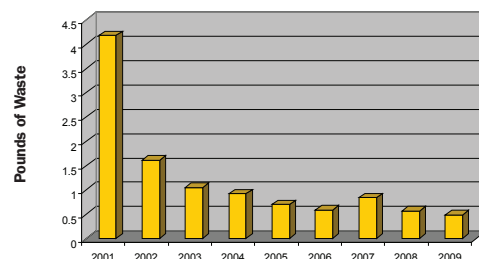
### COOLANT WASTE



### WASHER WASTE



### WASTE SUMP RATIO



AREA OF SAVINGS	ANNUAL COST SAVINGS
Water Treatment	\$61,000
Labor	\$11,000
<b>Total</b>	<b>\$72,000</b>

Then in 2002, Quaker began providing advanced on-site chemical testing, analysis and reporting, resulting in cost savings of \$15,000. These initial changes were just the beginning. Over the years, Quaker has not only

In 2007, the floor and machine cleaner being used by the manufacturer was converted to QUAKER FORMULA™ 76 ITT, resulting in an annual savings of \$13,000. Furthermore, Quaker's RapidShield™ 0007 Clear floor coating was used to coat a 100,000

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ft<sup>2</sup> area of floor space that included yellow lines and red/white stop signs. By using RapidShield™, the customer received a cost-effective, instant-cure, environmentally friendly, near zero-VOC floor coating.

By the end of 2009, Quaker and the manufacturer had reduced coolant waste in the facility by 88%, while coolant volume increased to 70,000 diluted gallons. Also during 2009, Quaker's role expanded again, this time to include back-up coverage to the industrial wastewater treatment plant and laboratory duties. Quaker's Process Support Engineer became a state licensed operator, saving the customer an additional \$27,000 per year in labor costs. Over an eight year period, 2002 - 2009, Quaker and the aircraft engine manufacturer worked together to achieve a total savings of \$3,299,498.

Continuing their partnership, in early 2010 the customer agreed to convert to a second generation coolant, QUAKERAL® 388, for all machining and grinding in the facility including aluminum. This product change is projected to provide an additional 20% annual cost savings as well as improved lubrication, lower foam, better bio-resistance and improved sump life.

### THE PRODUCT

QUAKERCOOL® 7205 is designed for heavy-duty machining and grinding operations requiring a high degree of cleanliness, lubrication, cooling and corrosion protection. It is designed for machining cast aluminum but also contains a non-sulfurized, non-chlorinated, extreme-pressure additive for superior machining of cast iron and steel, including the nickel-based alloys. This product is a micro-emulsion that maintains the desirable characteristics of a semi-synthetic.

QUAKERCOOL® 7205 is very low-foaming, even when used with soft water and in high pressure applications (>80 bar / 11psi).

QUAKERAL® 388 is a high-performance emulsifiable metalworking fluid designed for heavy-duty machining and grinding operations requiring a high degree of lubricity, cleanliness, cooling and corrosion protection. It is recommended for more difficult machining and grinding operations on cast iron and steel alloys and for critical surface finish machining of cast aluminum alloys. QUAKERAL® 388 is designed to control microbiological growth including mycobacteria.

QUAKER FORMULA™ 76 ITT is a water-based liquid product recommended for cleaning floors, walls, and all types of shop machinery. QUAKER FORMULA™ 76 ITT is an extremely versatile cleaner capable of handling virtually all industrial shop cleaning jobs. Its grease cutting action comes from an alkaline detergent/citrus ingredient blend, which also provides a pleasant scent. Use it on just about any hard surface cleaning job in your factory or shop.

RapidShield™ 0007 Clear is a high gloss 100% solid, UV curing, permanent industrial floor coating intended for use on concrete floors. The RapidShield™ product range is cured using proprietary Quaker UV curing units. RapidShield™ 0007 Clear is formulated using only reactive 100% solids materials in order to conform to LEED Guidelines and is NSF Registered for Non-Food Compounds R2 Category.

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### PROCESS AND EQUIPMENT

#### QUAKERCOOL® 7205

Part	High Pressure Compressor Stators
System Size	450 gal
Part Alloy	Nickel
Water Hardness	30 ppm CaCO <sub>3</sub>
Concentration	6%
Application Pressure	750 psi
Filtration System	Polytech cyclonic filtration
Specific Operation	ECBN feather seal grind

#### QUAKERAL® 388

Part	Low Pressure Compressor Stators
System Size	300 gallons
Part Alloy	AMS 4312
Water Hardness	30 ppm CaCO <sub>3</sub>
Concentration	6%
Application Pressure	Flood
Filtration System	None
Specific Operation	High speed turning of inner shroud

### THE EXPERTISE

Metalworking lubricants represent a very minor part of the costs in a metalworking process, typically less than 1%. This case illustrates the importance of correct fluid selection. The impact of the fluid can be a multiple of its costs, making the price of a metalworking fluid insignificant. That is why Quaker focuses on developing fluids with the highest performance without compromise, fluids that sharpen your competitive edge.

Quaker Chemical Management Services (QCMS<sup>sm</sup>) offers a full range of process expertise and support. Quaker programs are ISO 9001 certified and have received numerous supplier certifications and awards for excellence. QCMS<sup>sm</sup> provides a disciplined approach to controlling the acquisition, delivery, storage, application and disposal of process fluids.

Quaker Chemical Management Services provides:

- » Management
- » Process Monitoring
- » Chemical Usage Reporting
- » Chemical Sampling
- » Knowledge Sharing
- » Fluid Recycling
- » Waste Management
- » Technical Support
- » Engineering Services